

Algae Program – Strains and Cultivation Session

Day 2 Introduction

Daniel Fishman, Technology Manager

April 4, 2023







Algae



Conversion



Systems



Data

Renewable Carbon Resources (RCR) - Algae Team



Nichole Fitzgerald Program Manager



Dan Fishman Technology Manager



Christy Sterner Technology Manager



Liz Burrows Technology Manager



Annie Otwell
AAAS Fellow



Jamie Meadows Project Monitor



Phil Lee Project Monitor



Frank Fields Project Monitor



Ty Robinson Business Support

Reviewer Introductions: Cultivation and Strains

- Lead reviewer: Dr. Tyler Johannes, Professor at University of Tulsa
- Dr. Ify Iwuchukwu, Director, Pilot Plant at Oxford Biomedica Solutions, LLC
- Dr. Kalyani Maitra, Associate Professor at Fresno State University
- Dr. Laura Carney, Former Director of Ag Sciencee at Heliae









THANK YOU, REVIEWERS!

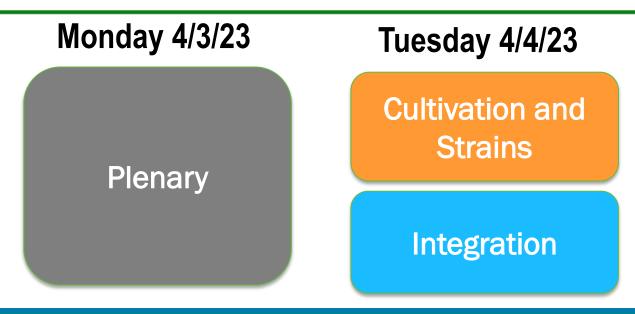
Agenda overview for BETO

Panel A = Cultivation and Strains, Panel B = Integration

		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Room 8
Monday					Dlanario				
	Morning	Plenaries Plenaries							
	Afternoon	Algae A	Algae B	FT	DMA	ABF	SDI A	SDI B	PABP
Tuesday									
	Morning	Algae A	Algae B	FT	DMA	ABF	SDI A	SDI B	PABP
	Afternoon	Algae A	Algae B	FT	DMA	ABF	SDI A	SDI B	PABP
Wednesday									
	Morning			FT	DMA	ABF	SDI A	SDI B	PABP
	Afternoon			FT	DMA	ABF	SDI A	SDI B	PABP
Thursday	Plenary				Plenaries	5			
	Morning	OW	FCIC			CO2	BC/Lignin	CatUp	PABP
	Afternoon	OW	FCIC			CO2	BC/Lignin	CatUp	PABP
Friday									
	Morning	OW				CO2	BC/Lignin	CatUp	
	Afternoon						BC/Lignin	CatUp	

Algae Session: 32 projects

Algae session themes at a glance



Lunch!

Cultivation and Strains

Integration

Cultivation and Strains

Integration

Day 2 Integration Projects

ADVANCED ALGAL SYSTEMS CULTIVATION AND STRAIN DEVELOPMENT

DAY 2 - TUESDAY APRIL 4, 2023

Start Time (MT)	End Time (MT)	Title	Organization	Speaker	
8:30 AM	8:45 AM	Technology Area Daily Intro	BETO		
8:45 AM	9:15 AM	Algae DISCOVR	PNNL, LANL, SNL, NREL, ASU	Michael Huesemann	
9:15 AM	9:45 AM	Algae DISCOVR	PNNL, LANL, SNL, NREL, ASU	Michael Huesemann	
9:45 AM	10:00 AM	Algae DISCOVR	PNNL, LANL, SNL, NREL, ASU	Michael Huesemann	
10:00 AM	10:30 AM	Break	All		
10:30 AM	11:00 AM	Broad Spectrum Antifungal Pond Protection	SNL	Todd Lane	
11:00 AM	11:30 AM	Ecological monitoring technologies to enhance large-scale microalgae cultivation, stability, and productivity EE0009673	Scripps Institution of Oceanography at the University of California, San Diego	Lisa Zeigler	
11:30 AM	12:00 PM	Hold for any conflicts; longer break if not needed			
12:00 PM	1:00 PM	Lunch	AII		

1:00 PM	1:30 PM	Advancing Algal Productivity through Innovation in Cultivation Operation and Strain Traits (ADAPT-COST) EE0009672	Colorado State University	Ken Reardon
1:30 PM	2:00 PM	Enhanced production of algae lipids and carbohydrates for fuel and polyurethane precursors EE0009671	University of California: San Diego	Stephen Mayfield
2:00 PM	2:30 PM	Direct Air Capture Integration with Algae Carbon Biocatalysis EE0009674	Arizona State University	John McGowen
2:30 PM	3:00 PM	Enhanced algae productivity in CO2 direct air capture cultivation EE0009675	Global Algae Innovations	Dave Hazlebeck
3:00 PM	3:20 PM	Break	All	
3:20 PM	3:50 PM	Microalgae Analysis	PNNL	Andre Coleman
3:50 PM	4:20 PM	Life-Cycle Analysis	ANL	Troy Hawkins
4:20 PM	4:30 PM	Adjourn	All	
4:30 PM	5:00 PM	Closed Door Comment Review Session	Reviewers	

Funding Opportunity Announcements

2018 2019 2020 2021 2022 2023 2024 **Reducing Agricultural Carbon** Minimize algae crop loss due to pests **Intensity and Protecting Algal** In review, up to \$10M available for award with no drop in **Crops (RACIPAC)** productivity **Carbon Utilization Technology:** >70% kg C harvested Selections made Sept & Dec 22, in award neg. **Improving Efficient Systems for Algae** biomass/kg C supplied 3 BETO & 6 FECM projects, none present over >30 day trail (CUTIES **Algae Productivity Exceeding Expectations** 5 of 6 projects presenting ncrease algal areal productivity (APEX) √y 20% producing 25 g/m²/day (1 not active yet) Algae Bioproducts and CO2 Dire Increase productivity 10% over -Air-Capture Efficiency (ABCDE) 7 of 7 ABCDE presenting baseline g/m²/day with CO₂ from DAC 2 of 2 SWIM presenting Achieve post-remediation wastewater **Synergistic Wastewater Integration** phosphorous content of <0.1mg/L with Microalgae (SWIM) **Cultivation Intensification** Achieve a 50% improvement in harvest 5 of 5 presenting **Processes for Algae (CIPA)** vield enabling 80 GGE/ton conversion yield 1 of 7 present **Efficient Carbon Utilization** Achieving, at a minimum, a 25% improvement in CO₂ utilization (remainder efficiency over the baseline with a minimum improvement of **Algal Systems (ECUAS)** complete) 25 g/m²/day

Algae Productivity Exceeding Expectations (APEX)

FY2021: DE-FOA-0002423

Objective - To develop and test strain and cultivation technologies that advance the state-of-the-art for algal areal productivity, and biomass quality achievable in industrially relevant cultivation systems.

- Topic Area 1: Improvements in productivity with traditional carbon dioxide (CO₂) supply
- Topic Area 2: Improvements in productivity with Direct Air Capture (DAC) of CO₂ from ambient air







Federal \$\$ Per Award	Total Federal Funding	Award Duration	Cost Share (%)
\$2.5M - \$3.2M	\$20M	3 years	20%

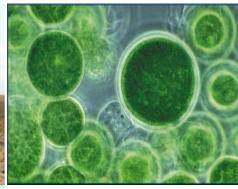
Advancing the Regional Feedstock Partnership

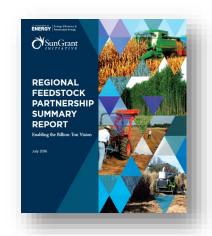




OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY







Save the date! June 6-7, 2023 Kansas City, MO

Purpose-grown energy crops will play an important role in meeting the 2050 SAF volumetric goals

Workshop to develop the vision for a next iteration of the RFP Share ideas, find collaborators, shape the vision of this important initiative!

Thank you!

